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ABSTRACT

Two brief guides offer suggestions for persons with physical disabilities who are considering the purchase of adaptive driving equipment, battery-powered scooters, or three wheelers. The first guide offers guidelines for individuals considering purchase of special hand controls or other modifications or a van lift to enhance their independence in the area of personal transportation. Hand controls are briefly described and the importance of dealing with a responsible vendor is emphasized. Insurance aspects are noted. An assessment quiz provides a checklist for the selection and purchase of hand controls. Van lifts in general and hydraulic and electric lifts specifically are briefly described. A similar quiz/checklist is offered to help in selecting a van lift. A listing of manufacturers of adaptive driving equipment is included. The second guide notes the popularity of small transportable three-wheeled scooters for individuals with mobility limitations. The guide briefly describes important features of the power and drive systems, batteries, steering and control features, braking, and seating and armrests. A 13-item assessment quiz is offered as a checklist for potential purchasers. A listing of U.S. manufacturers of battery-powered 3-wheelers is provided. (DB)

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Adaptive Driving Equipment: Selection and Major Considerations [and] Battery Powered Scooters and 3-Wheelers. Information Support Packets #1 and #2.
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EC 305386

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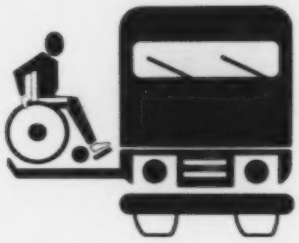
INFORMATION SUPPORT PACKET #1

Adaptive Driving Equipment



Selection and major considerations

Prepared by
John H. Stevens

This resource guide is intended to assist individuals with disabilities who are considering the purchase of adaptive driving equipment or other vehicle modifications that would enhance their independence in the area of personal transportation.

Adaptive driving equipment generally includes hand controls, automatic van lifts, steering and brake assist modifications, powered seats, custom control consoles, flooring, special mirrors, wheelchair restraint systems, and other modifications that enable a person with a disability to operate a car, van, or other motor vehicle.

Prior to shopping or searching for adaptive equipment, an individual needs to be familiar with the various types of devices that are available. It is important that you are not sold something that is inappropriate or that you clearly do not need. Some people know exactly what they will need to drive a van or car while others are less informed. If you do not know what you need, or if you are uncertain whether you have the physical ability to drive, you will need to be thoroughly evaluated.

Major rehabilitation centers, certain state agencies, or private consultants can provide this service. The actual person doing the evaluation may be a physical or occupational therapist, a driving instructor, or an independent consultant familiar with physical disabilities and the technical aspects of the various types of equipment. These specialists are trained in the assessment and evaluation of various disabilities and are impartial and objective in determining your needs. The headquarters of your state vocational rehabilitation department should be able to put you in contact with someone who can help determine your needs and abilities.

Center for Rehabilitation Technology Services
South Carolina Vocational Rehabilitation Department
1410-C Boston Ave. ■ West Columbia, South Caroina 29170 ■ (803) 822-5362/Voice TDD ■ E-mail rerc-vr@scsn.net
OCTOBER 1996

Hand controls

There are several different hand control designs on the market today. Some designs will not operate on certain cars and vans. You need to be very sure that the controls you are considering have been tested by a federal agency such as the Veteran's Administration or the U.S. Food and Drug Administration. Ask other people with disabilities about the equipment. Try to find out whether the equipment is dependable and commonly used by others; if possible, compare prices among several vendors. This could save you considerable expense. Do not hesitate to ask questions about the equipment and satisfy your concerns.

Other modifications and equipment:

In addition to lifts and hand controls, many other types of equipment and modifications are available. What can actually be done depends largely on the make and model of vehicle that must be adapted. For this reason, it is extremely important to seek out proper technical guidance and consultation prior to purchasing or adapting a vehicle. Certain modifications such as reduced effort steering and lowered flooring may affect the factory warranty. If a vehicle modification is going to require welding and metal fabrication, be sure that these things will be performed by certified and competent personnel. Find out about parts and materials that will be used and if you will be allowed to inspect the work during the various stages of construction. When possible, try to learn as much as you can about the vendor who will be doing the adaptations. How long has the firm been in business? Have their other customers been pleased with the work? Does this vendor have a good reputation for service and follow up? Many states do not have laws governing vehicle modifications. It often will be your responsibility to insure the quality of workmanship, operating safety, and performance regarding your adapted vehicle.

Insurance:

It is very important that you find out whether or not your automobile insurance company will insure the replacement cost of adaptive equipment and other modifications. When you consider the basic cost of your vehicle with the modifications, you must realize that you will be operating or using a very expensive, special and valuable vehicle. You will be taking a serious risk to not have it fully insured. If your company is not willing to offer you this insurance, keep searching until you find one that will. Some states may not require insurance companies to cover adaptive equipment. When they are required to do so, they will usually charge a higher premium, but it makes good sense to protect your investment in a transportation system.

ASSESSMENT QUIZ

Considerations in the selection and purchase of hand controls

1. Am I physically able to use the controls with reasonable ease?
   ❑ **YES** ❑ **NO**

2. Is the selling dealer within reasonable distance for convenient service?
   ❑ **YES** ❑ **NO**

3. Have the controls been tested or approved by the appropriate agencies?
   ❑ **YES** ❑ **NO**

4. Can the control be transferred to another car or van if I buy a new vehicle?
   ❑ **YES** ❑ **NO**

5. Do the controls have a variety of adjustment features to aid in accommodating me?
   ❑ **YES** ❑ **NO**

6. Will I, or a family member, be able to perform minor maintenance?
   ❑ **YES** ❑ **NO**

7. Are there other disabled people that I know who are using the control?
   ❑ **YES** ❑ **NO**

8. Does the manufacturer offer at least a 1 year warranty?
   ❑ **YES** ❑ **NO**

9. Will the controls interfere or prevent a non-disabled person from driving the car?
   ❑ **YES** ❑ **NO**

10. Does the selling dealer stock (in house) replacement parts for the controls?
    ❑ **YES** ❑ **NO**

Van Lifts

In many cases, the only practical method for a person with a disability to independently drive or have access to transportation is through the use of a van equipped with an automatic lift. There are several different brands and designs available with a variety of options. Depending on the make and model of van to be equipped, a lift can be installed in the side or rear door. A "fully automatic" lift can be equipped in such a way so that many wheelchair users can independently enter and exit the van. A "semi-automatic" lift is more commonly used in paratransit applications, or when an attendant or other family member will be driving the vehicle. Van lifts can be either "electro-hydraulics" or "all electric" in terms of operational design. Each design has certain advantages and disadvantages. These are briefly described below.

Hydraulic lifts:

These lifts are more commonly used in commercial applications. Paratransit companies, health care institutions, rehabilitation centers, and school districts tend to use lifts that are of the hydraulic design. These lifts have fewer switches to operate so employees can be quickly trained in their operation. They are serviceable by more dealers and replacement parts are, in some cases, available locally. Most hydraulic lifts are heavy and durable. They are often capable of lifting more weight than electric lifts. Their manual back-up systems are easy to understand and use.

Electric lifts:

The "all electric" lifts have different advantages. Because they do not require hydraulic fluid, they are very popular in the colder areas of the country, and with disabled consumers who have their own, custom vehicles. Most electric lifts are lighter in weight, usually not more than 180 pounds. There are no hydraulic hoses or fittings to leak and soil the van floor. The "all electric" principle allows the lift to operate consistently in a variety of climates and temperatures. They are available in the "platform" or "swingout" design. These lifts require a very low operating amperage and usually operate quite well using the vehicle's standard 12-volt DC factory battery. Some brands are quieter when operating. The electric lifts, due to the lighter weight, are more popular for use with the newer mini vans.

ASSESSMENT QUIZ

Considerations in selecting a van lift

1. Will the lift handle a minimum of 500 pounds?
   ❑ **YES** ❑ **NO**

2. Will I need a "dual entry" platform to aid in tight parking situations?
   ❑ **YES** ❑ **NO**

3. Is there a dealer within reasonable distance who can provide service?
   ❑ **YES** ❑ **NO**

4. Can this lift be removed, transferred and reinstalled in another van if the need arises?
   ❑ **YES** ❑ **NO**

5. Does this lift have a manual back-up system that can be easily operated by a friend or family member?
   ❑ **YES** ❑ **NO**

6. If I live near a coastal area where the air is damp and salty, will this lift rust easily?
   ❑ **YES** ❑ **NO**

7. Has this lift been tested for safety and dependability by the appropriate agencies?
   ❑ **YES** ❑ **NO**

8. Does this carry at least a 1 year warranty that includes parts and labor?
   ❑ **YES** ❑ **NO**

9. Are there dealers in other states that can provide service if I should need it while traveling?
   ❑ **YES** ❑ **NO**

10. Do I need a lift that will allow non-disabled passengers to also enter the van when the lift is in the folded position?
    ❑ **YES** ❑ **NO**

U.S. Manufacturers of Adaptive Driving Equipment:

Advanced Mobility, Inc.
12555 Sherman Way
North Hollywood, CA 91605
(818) 982-1004
(800) 554-6065

Ahnafield Corporation
3219 West Washington Street
Indianapolis, IN 46222
(317) 636-8061
(800) 636-8060

As-Tech, Inc.
8 Shovel Shop Sq.
North Easton, MA 02356
(508) 238-8080

The Braun Corporation
1014 S Monticello
P.O. Box 310
Wingmac, IN 46996
(219) 946-6153
(800) 843-5438

Cameron Enns Co.
13675 Madsen Ave.
Kingsburg, CA 93631
(209) 222-2922 /(209) 226-5141

Collins Industries Mobile-tech Corp., Inc.
Special Products Division
P.O. Box 2326
Hutchinson, KS 67504-2326
(316) 663-4441/(800) 835-5007

Creative Controls, Inc.
32450 Dequindre
Warren, MI 48092
(810) 979-3500 /(800) 539-7237

Crow River Industries, Inc.
14800 28th Ave. North
Minneapolis, MN 55447
(800) 488-0359
(612) 559-1680

Division Driving Systems, Inc.
9151 Hampton Overlook
Capitol Heights, MD 20743
(301) 499-1000
(800) 835-2002

Drive-Master Corporation
9 Spielman Road
Fairfield, NJ 07004
(201) 808-9709

EZ Lock
2001 Wooddale Blvd.
Baton Rouge, LA 70806
(504) 926-2403

Gresham Driving Aids, Inc
P.O. Box 405
30800 Wixom Road
Wixom, MI 48393
(810) 624-1533 /(800) 521-8930

Handicaps, Inc.
4335 S Santa Fe Drive
Englewood, Colorado 80110
(303) 781-2062 /(800) 782-4335

IMS
Independent Mobility Systems
4100 W Piedras St.
Farmington, NM 87401
(505) 326-4538/(800) 622-0623

Kroepke Controls
104 Hawkins Street
City Island, NY 10464
(718) 885-1100

Manufacturing and Production Services Corporation
7948 Ronson Road
San Diego, CA 92111
(619) 292-1423
(800) 243-4051

Mobility Products and Design, Inc.
14800 28th Ave. North
Minneapolis, MN 55447
(612) 559-1680
(800) 488-7688

Pick-A-Lift, Inc.
2038 West Olive Street
Lakeland, FL 33801
(813) 680-1460
(800) 743-5438

Q Straint
3085 Southwestern Blvd.
Orchard Park, NY 14127
(716) 675-2222

The Ricon Corporation
12450 Montague St.
Pacoima, CA 91331
(800) 322-2884 /(818) 899-7588

Wells-Enberg Company, Inc.
P.O. Box 6388
Rockford, IL 61125
(815) 227-9765 /(800) 642-3628

This list is not intended to be inclusive of all U.S. companies that manufacture van lifts, hand controls, and other adaptive driving aids. The South Carolina Vocational Rehabilitation Department does not endorse or recommend specific companies or firms.

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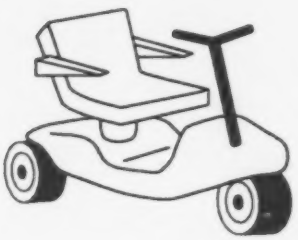
INFORMATION SUPPORT PACKET #2

Battery-Powered Scooters and 3-Wheelers



Prepared by
John H. Stevens

The popularity of small, transportable 3-wheeled scooters and similar mobility devices has increased dramatically in recent years. These products enable persons with disabilities to remain active in their homes, communities, and places of employment.

While 3-wheelers can assist individuals with all types of disabilities, they are primarily designed to aid the "mobility limited" person. Usually, this is a person who has limited ability to ambulate for distances that would be considered normal for a nondisabled person. Individuals with disabilities such as multiple sclerosis, heart and lung conditions, arthritis, or other conditions that limit one's endurance and stamina are good candidates for 3-wheeled vehicles.

Three-wheelers are available in a variety of designs and sizes. Various options and accessories are offered to help meet a person's individual needs. Anyone who is considering the purchase of a 3-wheeler should shop around, compare prices, and evaluate their own needs before making a decision. This guide can assist them in their efforts.

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South Carolina Vocational Rehabilitation Department
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Power and Drive Systems

Most 3-wheelers have either a front or rear wheel drive design. Each has its advantages and disadvantages. Those with a single, front wheel drive are better suited for indoor use on firm, level surfaces. The majority are powered by two 12-volt batteries although a few have a single 12-volt battery as their power source. Those using a single 12-volt system will be limited in range and grade-climbing ability. Also, they often have smaller frames that will allow a shorter turning radius and thus better maneuverability within the home. In addition, front wheel drive models tend to weigh less, thus making them easier to disassemble and load into an automobile or push manually in the event of power failure.

Rapidly gaining popularity are models with a dual rear wheel drive system. This design provides better traction due to the twin action of the rear wheels and the increased weight directly over the rear axle. The rear wheel drive models are larger in size and use a 24-volt dual battery system. This delivers a longer range per charge than a single battery system. These models are generally better suited to use outdoors because they are more stable and provide better traction in grass or sand. Also, the rear wheel drive models can climb moderate inclines with a greater speed than front wheel drive vehicles. A disadvantage is that these models are heavier and require more time and effort to disassemble and load into a car. Quite often a trunk lift, lift-equipped van, or other powered lift will be needed to transport the rear wheel drive models. In addition, most users discover that rear wheel drive scooters are not as practical for indoor use and often have to be used in conjunction with a standard manual wheelchair or a smaller 3-wheeler.

Batteries

Most of the 3-wheelers available today use "gel" or "lead acid" deep cycle batteries. Lead acid batteries are somewhat less expensive and can have a longer life, but require periodic maintenance. Gel batteries are more costly, but require no maintenance outside of regular charging. One major advantage of gel batteries is that commercial airlines will allow them aboard their aircraft if air travel with the scooter is necessary.

Steering and Control Features

The most popular and widely used steering method for 3-wheelers is the front handlebar design. It is similar to a bicycle handlebar except that it is shorter in horizontal width. Direction and ground speed are controlled by a lever on the handlebar which can be adjusted to a variety of positions to accommodate individual needs and capabilities. Usually, the motor is activated by a push, pull, or squeeze of the finger, thumb, hand, or wrist. In conjunction with a variable speed lever, several manufacturers use a Hi/Lo speed switch or an adjustable "maximum speed" setting. These features allow the user to individually tailor the ground speed and sensitivity of the controls. Most models of 3-wheelers also have an adjustment to tilt the handlebar from 90 degrees to 30 degrees. This enables the user to position the controls for the ultimate in convenience. The average top speed for most 3-wheelers is around 5.5 miles per hour, although this may vary depending on the particular make and model, and the terrain over which it is being driven.

Braking

Braking systems used on 3-wheelers are usually one of four types: manual, electro-mechanical, regenerative, and dynamic. Regenerative and dynamic generally work together, and the scooter will stop when the user takes his hand off the speed control. Electro-mechanical braking systems, introduced in the past two to three years, enable a scooter to stop on a hill. Without electro-mechanical braking, 3-wheelers may not be as safe to operate in hilly terrain. A manual braking system is usually a simple hand lever that is used to engage an immobilization device against one or more wheels. This is considered by many users to be more of a "stabilization" device rather than braking.

Seating and Armrests

The disability of the user will normally determine what seat options are needed. Most manufacturers offer at least two options in upholstery and cushioning. A disabled individual who lacks normal sensation in the thighs and buttocks will often need a thicker cushion or often a "prescription" cushion. On the other hand, if the person is sensate and can tolerate longer sitting times, they may need nothing more than a plastic molded or vinyl covered seat. Finally, if the user will need the 3-wheeler to help facilitate the activities of daily living such as doing laundry or standing at a sink, a powered elevating seat with a swivel feature might be necessary. Considerable thought should be given as to what activities will be done from the device prior to ordering seating features. Also, some thought should be given to armrests and whether they are necessary. Most users find they aid in trunk balance and in weight shifts. Most manufacturers offer armrests that flip up and detach to aid in transfers.

The Assessment Quiz on the following page should be used as a checklist when purchasing a 3-wheeled scooter. Answer these questions as they pertain to your needs or those of the person using the device.

Questions to consider when shopping for a 3-wheeled scooter

1. Will this device be used primarily ❑ indoors or ❑ outdoors?
   What percentage of time for each? Indoor _____% Outdoor _____%

2. Can the user independently disassemble and load the scooter into a car, if needed?
   ❑ **Yes** ❑ **No**

3. Can the user independently attend to minor maintenance such as the batteries, brake adjustment, tire air pressure and similar items? ❑ **Yes** ❑ **No**

4. Will this 3-wheeler operate on both "gel" and "lead acid" batteries? ❑ **Yes** ❑ **No**
   Is there a nearby source to buy batteries at a reasonable cost? ❑ **Yes** ❑ **No**

5. Will the dealer provide service for the vehicle? ❑ **Yes** ❑ **No** Will the user have to deal with a manufacturer by ❑ phone or ❑ correspondence?

6. When disassembled, will the 3-wheeler fit into the ❑ car's trunk, ❑ luggage area, or ❑ back seat?

7. Does the dealer also offer a lifting mechanism compatible with the scooter to aid with loading and unloading? ❑ **Yes** ❑ **No** If yes, will the dealer install, adjust, and service the lift? ❑ **Yes** ❑ **No**

8. Is the user's home architecturally accessible to the extent that using a 3-wheeler indoors will be practical?❑ **Yes** ❑ **No** Does the home have a ramp? ❑ **Yes** ❑ **No**
   How wide are the doorways? _____

9. How long is the manufacturer's warranty? _____ Does it include parts and labor? ❑ **Yes** ❑ **No**

10. Does the dealer stock replacement parts? ❑ **Yes** ❑ **No** If no, are they willing to order them?
    ❑ **Yes** ❑ **No** How long will this take? _____

11. How far away does the user live from the nearest factory-authorized dealer? _____

12. Will the user need special features such as a ❑ front basket, ❑ swivel seat, or ❑ powered elevating seat? Are the added conveniences worth the additional costs? ❑ **Yes** ❑ **No**

13. Does the 3-wheeler under consideration offer enough adjustments and add-on features to accommodate the user's disability five years in the future? ❑ **Yes** ❑ **No**

U.S. MANUFACTURERS OF BATTERY-POWERED 3-WHEELERS

This list is not intended to be inclusive of all manufacturers of 3-wheelers. The South Carolina Vocational Rehabilitation Department does not endorse, or recommend specific firms, companies, or other entities engaged in the manufacturing of mobility equipment.

Ahnafield Corp.
3219 W. Washington St.
Indianapolis, IN 46222
(317) 636-8061

Amigo Mobility International
6693 Dixie Highway
Bridgeport, MI 48722-0402
(517) 777-0910/(800) 821-2710

Braun Corporation
1014 South Monticello
P. O. Box 310
Winamac, IN 46996
(219) 946-6153/(800) 843-5438

Bruno Independent Living Aids
1780 Executive Drive
P. O. Box 84
Oconomowoc, WI 53066
(414) 567-4990/(800) 882-8183

Creative Controls, Inc.
32450 Dequindre
Warren, MI 48092
(810) 979-3500

Crow River Ind.
14800 28th Ave., N.
Minneapolis, MN 55447
(800) 488-0359

Dignified Products Corp.
Div. of Electric Mobility
P. O. Box 337
Mantua, NJ 08051
(800) 548-7905

Drive Master Corp.
9 Spielman Rd.
Fairfield, NJ 07004
(201) 808-9709

Electric Mobility Corp.
1 Mobility Plaza
Sewell, NJ 08080
(609) 468-0270/(800) 662-4548

E Z Lock, Inc.
2001 Wooddale Blvd.
Baton Rouge,LA 70806
(504) 926-2403

Everest & Jennings, Inc.
1100 Corporate Square Drive
St. Louis, Missouri 63132
(805) 987-6911/(800) 235-4661

Golden Technologies
159 Penn Avenue
Exeter, PA 18643
(800) 624-6374

Invacare Corporation
P. O. Box 4028
899 Cleveland Street
Elyria, OH 44036-2125
(216) 329-6000/(800) 333-6900

Lack of America
Div. of Ortho-Kinetics, Inc.
West 226 North 507
Springdale Road
(800) 446-4522/(414) 452-6060

Motovator Corp.
1732 Border Avenue
Torrance, CA 90501
(213) 320-5941
(800) 435-2721

Pride Health Care, Inc.
71 South Main Street
Pittson, PA 18640
(717) 655-4305
(800) 457-5438

Q Straint
3085 Southwestern Blvd.
Orchard Park, NY 14127
(716) 675-2222

Ranger All Season Corporation
P. O. Box 132
George, IA 51237
(712) 475-2811
(800) 225-3811

Ricon Corporation
12450 Montague St.
Pacoima, CA 91331
(800) 322-2884
(818) 899-7588

Struck Corporation
Box 307
W 51 N545 Struck Lane
Cedarburg, WI 53012
(414) 377-3300

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